Space Weather Forecast

Issued on Sunday 8 December 2024 at 13:05 Local

This forecast provides a four-day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

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Space Weather Forecast Headline: Chance of Moderate flares and a Slight chance of Solar Radiation storms and isolated High-class Flares.

Analysis of Space Weather Activity over past 24 hours

Solar Activity: High activity was observed peaking at 08/0906 UTC from a sunspot region in the southwest. This was preceded with earlier Moderate-class flares.

There are now up to nine regions on the facing side, with further sunspot regions likely to rotate around the southeast limb. The southeastern sunspot group is currently the most complex region on the Earth-facing side, although the region in the southwest that produced the High-class flare has the potential to produce further flares.

Following on from the earlier High-class flare analysis is currently on-going, pending results for any Earth-directed CME's. Early indications hint that we may see an enhancement to the geomagnetic activity from early on Day 3 (10 Dec) but this is subject to further analysis.

Solar Wind / Geomagnetic Activity: Solar winds remain Slow-ambient with speeds 350-390km/s. The interplanetary Magnetic Field (IMF) has been largely Moderate with the north-south component fluctuating between south directed and north directed for the first half of the period before favouring southerly conditions from midnight UTC.

Quiet geomagnetic activity throughout.

Energetic Particles / Solar Radiation: No solar radiation storms were observed.

Four-Day Space Weather Forecast Summary

Solar Activity: Chance of isolated Moderate flares, and a Slight Chance of isolated High-class flares, with no significant sunspot region departures, but perhaps one imminent significant returning region.

Solar Wind / Geomagnetic Activity: Initially slow solar winds may give way to increasing solar wind speeds during day 1 (08 Dec), although any effect is likely to be muted given our proximity to the solstice. Initial evaluation of a Coronal Mass Ejection (CME) associated with the X2.2 flare looks to potentially see some Earth-directed impacts from early Day 3 (10 Dec) but further analysis is needed.

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Quiet to Unsettled geomagnetic conditions are expected with perhaps a Slight Chance of Active throughout, potentially increasing from Day 3 onwards.

Energetic Particles / Solar Radiation: There is a slight chance that the recent High-class X-ray activity near the western solar horizon may produce an S1-scale (Minor Solar Radiation Storm) enhancement, giving a modest rise in the risk within Day 1 (08 Dec), slowly returning to background levels through Day 2 (09 Dec).

Geomagnetic Storms

Geomagnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	G1 to G2	No	1	1	5	5
Strong	G3	No	1	1	1	1
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X-Ray Flares

X-Ray Flares Probability	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	R1-R2 (M Class)	Yes	50	50	50	50
Very Active	R3-R5 (X Class)	Yes	10	10	10	5

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Solar Radiation Storms (High Energy Protons)

Radiation Storms Probability (Exceedance)	Level ($cm^{-2}sr^{-1}s^{-1}$)	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	**≥ S1**	No	10	10	5	5
Very Active	**≥ S3 ***	No	1	1	1	1
* S3 ≥ 10 MeV ≥ 1000 pfu and/or 50 MeV ≥ 10pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)						

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